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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,083	04/02/2001	Gilad Sade	EMS-01002	8504
26339	7590	11/05/2004		
PATENT GROUP CHOATE, HALL & STEWART EXCHANGE PLACE, 53 STATE STREET BOSTON, MA 02109			EXAMINER CHACE, CHRISTIAN	
			ART UNIT 2187	PAPER NUMBER

DATE MAILED: 11/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/824,083

Applicant(s)

SADE ET AL.

Examiner

Christian P. Chace

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-19,21-33 and 35-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-11 is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7,12-19,21-33,35-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5 August 2004 has been entered.

Response to Amendment

The Office action has been issued in response to RCE filed 17 September 2004 and previously not entered, now entered, amendment filed 5 August 2004. Claims 4, 20, and 34 are canceled. Claims 1-3, 5-19, 21-33 and 35-41 are pending. Applicants' arguments have been carefully and respectfully considered, but they are not entirely persuasive. Arguments that were persuasive have resulted in the removal of the respective objections and rejections. Arguments that were not persuasive have resulted in the objections and/or rejections being repeated herein. As this is a first action on the merits following an RCE, this action is NOT final.

Terminal Disclaimer

The terminal disclaimer filed on 5 August 2004 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent 6,604,171 filed on 29 September 2000 has been reviewed and is accepted. The terminal disclaimer has been recorded.

The terminal disclaimer filed on 17 September 2004 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent 6,591,335 filed 29 September 2000 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 31-33 and 35-41 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims recite "a computer readable medium." As applicants have not defined this "computer readable medium" to be within the scope of patentable subject matter (i.e., to exclude carrier waves and the like), it must be rejected as being non-statutory subject matter.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 5-19, 21-33, and 35-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants have amended independent claims 1, 18, and 31, to include:

"...wherein data contained in said first and second cache memories includes control data and corresponding disk data, said control data being replicated in said first and said second cache memories independent of whether said corresponding disk data is included in both said first and second cache memories..."

The instant specification discloses, "...wherein data contained in said first and second cache memories includes control data and corresponding disk data, said control data being replicated in said first and said second cache memories..."

However, the instant specification does not disclose the replication being, "...independent of whether said corresponding disk data is included in both said first and second cache memories..."

In fact, the instant specification recites, at page 18 in lines 1-2, "[T]hat is, every time data is read from the disk storage area [disk data] to the cache, or data that is in the cache is modified by the host, the data is written to both of the cache memories."

Also, page 16, lines 14-16, recites, "Following the step 114 is a step 116 where the control data for a particular slot, in both of the memories 22, 24, is marked to indicate that the slot is write pending, indicating that the data has been modified while stored in the cache. As discussed above, the control data is written to both the primary and secondary storage areas."

Accordingly, it would appear from the instant specification, that the control data is, in fact, actually dependent on whether the disk data is included in both of said first or second memories, as the disk data is written to both of the caches memories, as is the control data for that disk data.

The remaining claims depend upon the instant claims and are rejected for at least the reasons set forth supra with respect to same.

Claims 31-33 and 35-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not provide an adequately written description of a computer program product **which is stored on a computer readable medium**. A computer program product does not have to be stored in a tangible device such as a memory, to be acted upon – it could be received by a carrier wave, for example.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 5-19, 21-33, and 35-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to independent claims 1, 18, and 31, as discussed supra, the instant specification does not disclose the control data replication being independent of the disk data being stored in both caches.

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In addition, examiner is unsure what applicants are referring to by the term "independent." As the control data appears to be related to the disk data by describing it, examiner is unsure how it can then be independent of that data.

Would applicants be attempting to claim that it doesn't matter whether the disk data is in both caches or just one – either way, the control data is stored in both caches? If this is the case, then applicants are encouraged to rewrite the claim language to more exactly and concisely recite that fact. However, examiner is unsure whether that assertion would be adequately described in the specification – applicants would be strongly encouraged to point out where in the specification this assertion would be supported, if, indeed, that is applicants invention.

The remaining claims depend upon the instant claims and are rejected for at least the reasons set forth supra with respect to same.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 5-7, 12-19, 21-32, and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dewey et al (US Patent #5,724,501) in view of Kurokawa et al (US Patent #6,571,350).

With respect to claim 1, as well as claims 18 and 31, Dewey et al discloses a method and system for managing data in a cache, the system including a first cache

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memory including data (cache 20 in Figure 1, e.g.) and a second cache memory including data (cache 21), wherein at least some of the data included in the first cache memory is the same as at least some of the data of the second cache memory (see column 5, lines 34-52). Data contained in said first and said second cache memories including control data and corresponding disk data is disclosed as metadata and status data indicating whether the data is “dirty” or modified, is disclosed in the abstract as well as in column 4, lines 23-24, for example. The corresponding disk data is stored in the caches with the metadata, as discussed in column 5, lines 40-41, for example. Said control data being replicated in said first and said second cache memories is disclosed in the abstract. The control data being replicated independent of whether said corresponding disk data is included in both said first and second data caches is interpreted by examiner to mean that its doesn’t matter whether the disk data is in both caches or just one – either way, the control data is stored in both caches. This is taught in the abstract, which discussed the metadata being copied to both caches, and then the disk data being established in both controllers after the control data is copied.

However, Dewey et al does not teach providing cache selection hardware for selecting, in response to a request for data that is stored in both the first cache memory and the second cache memory, which one of the first and second cache memories to use to obtain the data in accordance with an access balancing technique.

Kurokawa et al discloses a method and system for managing data in a redundant storage configuration, the system including first and second memories (storage devices S0 and S1), wherein at least some of the data of the first cache memory is the same as

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at least some of the data of the second cache memory (see column 4, lines 34-39 and 54-63, e.g.). Kurokawa et al further teaches, in response to a request for data that is stored in both the first cache memory and the second cache memory, choosing which one of the cache memories to use to obtain the data according to an "access balancing" technique (see column 2, lines 55-67 and column 5, line 67 to column 6, line 4, e.g.) so as to even out or balance accesses between the storage devices. While Kurokawa et al does not state that the storage devices S0 and S 1 are themselves "cache" storage devices, Kurokawa et al teaches that they may include some "cache" storage (see column 9, line 62 to column 10, line 10, e.g.)

Accordingly, it would have been readily obvious to one of ordinary skill in the art at the time the claimed invention was made to select or choose which one of the memories in Dewey et al to use to obtain data in response to a request for data that is stored in both the first cache memory and the second cache memory, because Kurokawa et al teaches that performance of a data storage system storing redundant data may be improved by evening out or balancing accesses to two (or more) storage devices storing the same data in column 2, lines 3-5 and 65-67, for example.

Also with respect to claim 31, as well as claims 19 and 21-28, one of ordinary skill in the art would readily recognize that computer related inventions may be implemented in software or hardware, and the selective use of software or a "computer program product," or a combination of hardware and software, to implement the method and system of Dewey et al in view of Kurokawa et al as previously discussed, would have been readily obvious to one of ordinary skill in the art at the time the claimed

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invention was made and, as such, does not render the claimed invention patentably distinct.

With respect to claims 2 and 7, as well as claims 23-24, 32, and 37, Kurokawa et al disclose that the access balancing technique may include selection using an interleaving technique so that the memories are alternately accessed. In this manner, the memories may be accessed in a "round robin" manner.

With respect to claim 16, Dewey et al discloses that the data may include "control data" such as status data indicating whether the data is "dirty" or modified, as well as corresponding disk data. Kurokawa et al also teaches storing data indicative of the status data in the memories.

With respect to claims 5 and 6, as well as claims 35 and 36, access to both the control data and disk data stored in Dewey et al may be balanced in light of the teachings of Kurokawa et al, i.e., the same balancing technique may be used for the control data and disk data.

With respect to claims 12-15 and 17, Kurokawa et al teach that the selection of the cache memories may utilize circuitry which may be considered to be "specialized" hardware, and that the "specialized" hardware may include at least one chip or integrated circuit (see column 19, lines 48-53, e.g.).

With respect to claims 29 and 30, Dewey et al teach providing first and second buses (see buses 18A and 18B) coupled to the first and second cache memories and associated controllers, similar to the first and second buses shown in applicants' Figure 1A.

Claims 3 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dewey et al in view of Kurokawa et al as applied to claims 1-2, 5-7, 12-19, 21-32, and 35-37 above, and further in view of Mason et al.

With respect to claim 3, as well as claim 33, Dewey et al in view of Kurokawa et al disclose a method for managing data in a data storage system including balancing access to first and second cache memories which store common data (see supra), but does not teach that the access balancing technique is based on statistics including monitoring a number of accesses of the memories over a predetermined amount of time and selecting one of the cache memories based on the access frequencies.

Mason et al similarly discloses a data storage system including a plurality of memories storing mirrored data, and additionally teaches dynamically adjusting a mirror service policy by collecting statistics regarding accesses to the memories over a period of time in order to more evenly balance loading within the storage system (see page 2, lines 23-35 and page 6, lines 5-27, as well as claims 1-3 and 7, e.g.).

Accordingly, it would have been readily obvious to one of ordinary skill in the art at the time the claimed invention was made to provide an access balancing technique in a mirrored storage system, which access technique is based on statistics, as taught by Mason et al, in the mirrored storage system of Dewey et al in view of Kurokawa et al, in order to more evenly balance loading the data storage system, as discussed in the citations supra.

Allowable Subject Matter

Claims 8-11 are allowed.

Response to Arguments

As discussed supra, the arguments applicants have put forth that examiner found persuasive are now moot, as examiner has removed the respective objections and rejections.

Examiner has, however, repeated the 35 USC 112, 1st paragraph rejection of claims 31-41, under the written description requirement, upon further consideration of the claim language. Examiner has attempted to elaborate on that rejection, supra, which examiner believes adequately responds to applicants' traversal of same.

Applicants' argument with respect to this rejection is, "...for code to be machine executable, it is stored on a computer readable medium." This is not necessarily true, and the code could be transmitted to a processor via carrier wave, and never stored anywhere – merely acted upon directly. Also, applicants claim that for code, "machine executable" can only mean executable on a processor. Examiner strongly disagrees with this assertion. It means executable on a machine, and can have no more or less meaning – if applicants wish to assert that it must be a processor, examiner suggests changing the terminology to recite, "processor executable." And even then, it only means that it is *able* to be executed on a processor, not that it necessarily will.

Examiner has maintained a 35 USC 103(a) rejection of most of the claims, as discussed supra. However, applicants' arguments with respect to the former rejection are based on the fact that applicants do not believe that the reference teaches the newly-added limitations of the independent claims. Examiner has provided support in the cited prior art as applied to the claims as they stand instantly, as well as elaboration

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of the positions offered previously and maintained instantly. Accordingly, examiner believes the rejections supra adequately respond to applicants' traversal of same.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian P. Chace whose telephone number is 571.272.4190. The examiner can normally be reached on MAXI FLEX.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571.272.4201. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christian P. Chace
Examiner
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